B-3

Supporting Content Web Sites

The Effects of Light Intensity and Wavelength on the Rate of Photosynthesis
http://www.biologycorner.com/worksheets/photosynthesis_sim.html
Students use the simulation to determine how wavelength and intensity affect the rate of photosynthesis (and the production of ATP).
B3-1

Aerobic and Anaerobic Respiration
http://www.sp.uconn.edu/~terry/Common/respiration.html
An interactive, animated exploration of cellular respiration, including aerobic and anaerobic respiration, the electron transport system, and the proton gradient.
B3-2

ATP and Biological Energy
http://www.emc.maricopa.edu/faculty/farabee/biobk/BioBookATP.html
This website gives information on the composition of ATP, the functions of the ATP/ACP cycle, phosphorylation and the electron transport chain.
B3-3

ATP: The Energy Currency of the Cell
http://student.ccbcmd.edu/~gkaiser/biotutorials/energy/atp.html
This simple website offers basic information on ATP plus two good animations- one illustrating the ADP-ATP cycle and the other illustrating how ATP provides energy for to the cell.
B3-3

Basics of Biochemistry
http://www.chem4kids.com/files/bio_intro.html
A very basic website that allows students to learn about the structure of proteins, lipids, carbohydrates and other organic molecules.
B3-4 and 3-5

Carbohydrates
http://faculty.nl.edu/jste/carbohyd.htm
Information, diagrams, and animation on carbohydrates.
B3-4 and 3-5

Regents Prep: Living Environment: Ecology
http://regentsprep.org/Regents/biology/units/ecology/energy.cfm
Includes diagrams and definitions as well as practice questions from the Regents' test.
B3-6

Energy through Our Lives
http://www.uwsp.edu/CNR/wcee/keep/Mod1/Flow/foodchains.htm
Text and diagrams show how food chains cycle nutrients within an ecosystem and provide the mechanism for energy to flow through the ecosystem.
B3-6

Iowa School for the Deaf- Biotic Relationships
http://www.iadeaf.k12.ia.us/Biotic%20Relationships.htm
Students use this computer simulation to explore predator/prey populations. It includes energy pyramids and compares the total amount of energy available in each trophic level.
B3-6

Suggested Literature

Peil, Gerard. (2001). *The Age of Science*. New York: Basic Books.
ISBN: 0465057551.
Lexile Level: 1270L
Tells how the processes of photosynthesis and cellular respiration were discovered.
B3-1 and B3-2

Harold, Frank. (2001). *The Way of the Cell*. New York: Oxford University Press.
ISBN: 0195135121
Lexile Level: NA
Information on cell organelles and the roles they play in cell respiration and photosynthesis.
B3-1, 3-2, 3-3

Lee, Rupert. (2002). *The Eureka! Moment*. New York: Routledge Publishing.
ISBN: 0415939410
Lexile Level: NA
Gives information about the discovery of the Krebs cycle, the Calvin cycle, and the role of ATP.
B3-1, 3-2, 3-3

Trefil, James. (2003). The Nature of Science. New York: Houghton Mifflin Company.
ISBN: 0618319387
Lexile Level: NA
Information about photosynthesis and ATP.
B3-1, 3-2

Dunne, Lavon. (2002). *Nutrition Almanac, 5th edition*. New York: McGraw-Hill.
ISBN: 0071373381
Lexile Level: NA
A wide variety of information on various foods including the macromolecules and their relative caloric values.

B3-4

The Facts on File Dictionary of Organic Chemistry. (2004). New York: Facts on File
ISBN: 0-8160-4928-9
Lexile Level: NA
This book includes alphabetized entries on common organic terms.
B3-4, 3-5

Suggested ETV Streamline SC or ITV Video Resources

Elements of Biology: Matter and Energy: Organization in Living Systems
Photosynthesis
ETV Streamline SC
The ultimate energy source is the sun. The terms autotroph and heterotroph are defined and both stages of photosynthesis are described briefly.
03:45
B3-1

Elements of Physics: Energy: Work and Power
Chemical Energy
ETV Streamline SC
The sun is shown as the ultimate source of almost all energy on earth. Autotrophs are defined as organisms capable of transforming the sun's energy into chemical energy.
02:04
B3-1

Energy and the Chemistry of Life
Dark Reactions of Photosynthesis
ETV Streamline SC
The light independent reactions of photosynthesis are discussed and the chemical equation for photosynthesis is presented. The importance of photosynthesis to life on earth is emphasized.
02:10
B3-1

Elements of Physics: Energy: Work and Power
Energy as Work
ETV Streamline SC
The relationship between work and energy is explored. Energy transfer is examined briefly.
01:21
B3-1

Elements of Biology: Matter and Energy: Organization in Living Systems
Glycolysis and Cellular Respiration

ETV Streamline SC
A glucose molecule is broken in half to yield two ATP molecules. In aerobic respiration, the Krebs cycle and electron transport chain are discussed.
01:54
B3-2

Energy and the Chemistry of Life
Aerobic Cellular Respiration
ETV Streamline SC
Glycolysis is discussed as the first step in respiration and the importance of mitochondria is emphasized. The citric acid cycle and electron transport chain are discussed and anaerobic respiration is mentioned briefly.
05:35
B3-2

Elements of Biology: Matter and Energy: Organization in Living Systems
ATP: The Energy Currency
ETV Streamline SC
ATP is introduced as a molecule that stores energy. The ATP-ADP cycle and how energy is released and stored are explained briefly.
02:26
B3-3

Energy and the Chemistry of Life
ATP: The Energy Currency of Cells
ETV Streamline SC
ATP is discussed as the molecule that allows energy to be stored and utilized by living things. The ATP-ADP cycle is also discussed as are the light dependent reactions of photosynthesis.
07:15
B3-3 and B3-1

Energy and the Chemistry of Life
Carbohydrates
ETV Streamline SC
The basic structure of carbohydrates is examined. Glucose is looked at and the term polymerization is introduced when molecules of glucose are joined together.
02:10
B3-4

Energy and the Chemistry of Life
Lipids: Fats and Oils
ETV Streamline SC
Lipid structure and function are discussed. The role of lipids in energy storage is emphasized.
00:37

B3-4 and B3-5

Energy and the Chemistry of Life
Proteins
ETV Streamline SC
Amino acids are shown as the building blocks of proteins. The functions of proteins are discussed and function is related to the type of amino acids found in each protein and how they are joined to determine the protein structure. The role of proteins as enzymes is emphasized.
01:47
B3-4 and B3-5

Elements of Biology: Matter and Energy: Organization in Living Systems
Energy Flow
ETV Streamline SC
Why living organisms need a constant source of energy is examined. The concept of exergonic and endergonic reactions as releasing and consuming energy as part of an energy cycle is introduced.
02:26
B3-6

Food Chains and Webs
Biomass
ETV Streamline SC
The definition of biomass is given and an example of a biomass pyramid is shown. The clip emphasizes that that the biomass of producers on the bottom of the pyramid is usually greater than the biomass of the consumers in the higher levels. (best for lower level classes).
01:24
B3-6

Biology: The Science of Life: Ecology: Organisms in Their Environment
Pyramids of Energy and Numbers: Consumer Levels
ETV Streamline SC
This video clip gives basic information, diagrams, and definitions for a pyramid of energy and a pyramid of numbers.
01:55
B3-6.

Food Chains and Webs
Energy Pyramids
ETV Streamline SC
Energy is transferred through food chains and food webs and as much as 90% of the energy is lost as heat energy. Very basic but good.
01:05
B3-6

Elements of Biology: Ecosystems: Organisms and Their Environment
The Energy Flow
ETV Streamline SC
This video clip introduces the term abiotic and the idea that non-living factors are important in an ecosystem. A diagram of an energy pyramid is explained along with trophic levels. A biomass pyramid is also discussed.
02:10
B3-6

Career Connections

Biochemist
Biochemists research the processes in living organisms to better understand their metabolism and how they survive. They also use their skills in the fields of genetics, nutrition, medicine, and ecology. Biochemists conduct scientific research, write papers, and apply their knowledge in ways that help improve the earth.
B3-4, 3-5, 3-6

Registered Dietician
Registered dieticians help prevent and treat illnesses in people by recommending dietary modifications, based on a doctor's recommendation. They may work in hospitals as clinical dieticians, in public health agencies as community dieticians, or as consultant dieticians in private practice.
B3-4, 3-5

Certified Forester
A certified forester serves the public through stewardship of our nation's forests. They may choose to specialize in one area of forestry such as urban forestry or timber harvesting. A college degree is required as well as continuing education and an examination-based certification.
B3-1 and 3-6